B.TECH/ECE/6TH SEM/CSEN 3004/2019
OBJECT ORIENTED PROGRAMMING USING C++
(CSEN 3004)

Time Allotted : 3 hrs **Full Marks : 70**

Figures out of the right margin indicate full marks.

Candidates are required to answer Group A and
<u>any 5 (five)</u> from Group B to E, taking <u>at least one</u> from each group.

Candidates are required to give answer in their own words as far as practicable.

Group – A
(Multiple Choice Type Questions)

1. Choose the correct alternative for the following: **10 × 1 = 10**

(i) Which of the following is/are automatically added to every class if we do not write our own?
(a) Copy constructor (b) Assignment operator
(c) Default Constructor (d) all of these.

(ii) Given int *arr_ptr= new int[5]; what is the correct syntax for releasing this allocated memory size of 5 integers?
(a) delete arr_ptr (b) delete arr_ptr [ ]
(c) delete [ ] arr_ptr (d) delete arr_ptr[5].

(iii) If 'f' is a virtual function in a class X, then:
(a) 'f' must return an int
(b) 'f' must be overridden in all classes inherited from X
(c) there cannot be any non virtual function named 'f' with identical signature
(d) none of the above.

(iv) Which of the following is false about reference?
(a) Reference cannot be NULL
(b) A reference must be initialized when declared
(c) Once reference is created it cannot be later made to refer another object
(d) Reference cannot refer to constant value.

(v) Which of the following function must use reference?
(a) Assignment operator function
(b) Copy constructor
(c) Parameterized constructor
(d) Destructor.

(vi) Which of the following operators cannot be overloaded?
(a) Dot operator (b) Ternary operator
(c) Scope resolution operator (d) all of these.

(vii) Pick out the correct statement.
(a) A friend function may be a member of another class.
(b) A friend function may not be a member of another class.
(c) A friend function may or may not be a member of another class.
(d) none of the mentioned.

(viii) What is the general syntax for accessing the namespace variable?
(a) namespaceid::operator (b) namespace,operator
(c) namespace#operator (d) none of the mentioned.

(ix) If a class contains pure virtual function, then it is termed as:
(a) virtual class (b) nested class
(c) pure local class (d) abstract class.

(x) If inner catch handler is not able to handle the exception, then:
(a) compiler looks for outer try handler
(b) program terminates abnormally
(c) compiler looks for appropriate catch handlerof outer try block
(d) none of these.

Group – B

2. (a) What do you mean by reference variable? Write proper syntax to declare reference variable. Suppose you have pairs of numbers in your program, and you want to be sure that the smaller one always precedes the larger one. Write a C++ program that calls a function order () which checks two numbers passed to it by reference and swaps the originals if the first is larger than the second.

(b) With example explain three sting manipulation functions.

(2+ 1 + 3 = 6) + (2+ 2 + 2 = 6) = 12

3. (a) Write an example to show how C++ allows a non-member function to access private and protected data of a class.

(b) What are the characteristics of friend function?

(c) What are the properties of static member? Write proper syntax of declaration and initialization of static data member.

3 + 4 + 5 = 12

Group – C

4. (a)   What is abstract class?

  (b)   List out the advantages of new operator over malloc().

  (c)   What do you mean by actual parameter and formal parameter? Explain with example.

  (d)   What are the differences between call-by-address and call-by-reference? Explain with example.

2+ 3 + 4 + 3 = 12

5. (a)   What do you mean by function overloading? Give an example.

  (b)   Write a constructor definition to provide input for a 2D array at runtime. 2D array should be created at runtime.

  (c)   What do you mean by constant membership function and constant object? Explain with proper example.

4 + 4 + 4 = 12

Group – D

6. (a)   Write a C++ program to overload new and delete operator.

  (b)   What is the limitation of increment and decrement operator? How does C++ resolve this limitation?

  (c)   Write operator overloading function to distinguish between prefix and postfix increment operation on object of a class.

5 + 2 + 5 = 12

7. (a)   Write output of the following code? Explain your answer.
Make correction, if required.

```cpp
#include<iostream>
using namespace std;
class Base
 {
     public:
         Base(int a){cout<<"Base constructor";}
};
class Child: public virtual Base
{
    public:
        Child(): Base(5){cout<<"Child constructor";}
};
class Grandchild: public Child
{
     public:
         Grandchild(){cout<<"Grandchild constructor";}
};
int main()
{
    Grandchild d;
    return (0);
}
```

  (b)   Create a base class shape which stores two member variables length and breadth and member function displayArea() and calculateArea ().Derive two classes rectangle and triangle from the base class shape. Using runtime polymorphism calculate area of rectangle and right- angled triangle.

5 + 7 = 12

Group – E

8. (a)   How base class member function can be invoked in a derived class if the derived class also has a member function with the same name? Give proper example.

  (b)   What is class template? Explain the syntax of class template with suitable example. Write a program to swap two variables of different type using function template.

4 + 8 = 12

9. (a)   Write a program to read three integers x, y and z and evaluate r given by
$$r = z / (x - y)$$
Use exception handling to throw an exception in case division by zero is attempted.

  (b)   How are template functions overloaded? Explain with a suitable example.

(7 + 2) + 3 = 12